

Mr. Hargitt's treatment of our Pileated Woodpecker presents a curious and lamentable case. He removes it from the genus *Cocophylæus* (the propriety of which we leave as merely a question of opinion) and places it under *Dryotomus* of Swainson (1831), of which he considers *Hylatomus* of Baird (1858) as a pure synonym, giving the *same species as the type of each*, namely, *Picus pileatus* Linn. Although Swainson placed *P. pileatus* under his genus *Dryotomus*, he expressly gives as its "Typical species," *Picus martius* (Fauna Bor.-Am., II, p. 301), thus making his *Dryotomus* a pure synonym of the genus *Picus*, as of late restricted, leaving *Hylatomus* Baird available for *Picus pileatus*, for those who wish to separate it from *Cocophylæus*. Furthermore, *Picus pileatus* appears to have been placed under *Dryotomus* by only two authors, Swainson and Bonaparte, and by no one since 1838, till Mr. Hargitt came on the scene, while it was almost universally recognized as *Hylatomus pileatus* from 1858 to 1886! Swainson simply treated *Picus pileatus* and *P. martius* as congeneric species under his genus *Dryotomus*, expressly naming *Picus martius* as the type! In reviewing works so indispensable and of such inestimable value to the ornithologist as are the volumes of the British Museum 'Catalogue of Birds,' it is painful to find one's self confronted with misleading statements on points of vital importance in nomenclature, of which the above is unfortunately by no means an isolated case.—J. A. A.

Merriam's 'Results of a Biological Survey of the San Francisco Mountain Region and Desert of the Little Colorado, Arizona.'—In 'North American Fauna, No. 3,'* Dr. C. Hart Merriam, Chief of the Division of Ornithology and Mammalogy, U. S. Department of Agriculture, gives an account of results of a biological survey of the San Francisco Mountain region in Arizona made by him, with a small corps of assistants, during August and September, 1889. The area surveyed carefully comprised about 5,000 square miles, while 7,000 more were roughly examined, and a biological map prepared of the whole. In addition to Mr. Vernon Bailey, Dr. Merriam had with him in the field Prof. F. H. Knowlton, assistant paleontologist, U. S. Geological Survey, and Dr. Leonhard Stejneger, curator of reptiles in the U. S. National Museum. The report consists of (1) General Results, with special reference to the geographical and vertical distribution of species. (2) Grand Cañon of the Colorado. (3) Annotated List of Mammals with descriptions of new species. (4) Annotated List of Birds. (5) Annotated List of Reptiles and Batrachians, with descriptions of new species. The last is by Dr. Stejneger, the others by Dr. Merriam, who also has an illustrated paper on 'Forest Trees of the San Francisco Mountain Region, Arizona,' and another on

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'Relation of a Biological Survey to Agriculture.' The strictly ornithological portions are: 'List of Birds noted at the Grand Cañon of the Colorado, Arizona, September 10 to 15, 1889' (pp. 38-41), embracing 57 species; and an 'Annotated List of Birds of the San Francisco Mountain Plateau and the Desert of the Little Colorado River, Arizona' (pp. 87-101), comprising 150 species.

The work here under review is unique in its conception and methods, and of far-reaching importance in its results. Besides the discovery of many new species of mammals, and several new species of reptiles and plants, a systematic and detailed survey was made of the life zones of an isolated mountain peak, rising from the edge of an arid desert—a plateau region 7,000 feet above the sea—to an altitude of nearly 13,000 feet. In ascending "from the hot and arid desert of the Little Colorado to the cold and humid summit of the mountain no less than seven zones are encountered, each of which may be characterized by the possession of forms of life not found in the others." Each is discussed in detail, its characteristic animals and plants enumerated, and its relation to other faunal areas considered. Beginning at the summit is an 'Alpine Zone' (extending down to 11,500 feet), characterized by the prevalence of Arctic plants and a few Arctic animals, many of them circumpolar, not found at ordinary levels south of the tundras and barren grounds, and at intervening points only on the tops of the highest mountains. Below this is a 'Sub-Alpine or Timber-line Zone' (between 11,500 and 10,500 feet), likewise characterized by boreal forms of life, which, however, range much further south than the species characterizing the Alpine Zone. Below this is the 'Hudsonian or Spruce Zone,' corresponding to the so-called Hudsonian Fauna of boreal North America (northern New England to Labrador). Below this, in descending order, are the 'Canadian or Balsam Zone'; the 'Neutral or Pine Zone'; the 'Piñon Zone'; and the 'Desert Zone.' These are strikingly illustrated in a colored 'diagrammatic profile,' forming plate I of the accompanying illustrations.

From the study of the life zones of San Francisco Mountain, the author passes to 'Generalizations concerning the Distribution of Life in North America.' As recognized more or less vaguely by previous writers, the present life of the North American continent is derived primarily from two sources, a northern and a southern, the former circumpolar, the latter tropical. The extratropical portion of North America is divided into two primary life regions, a "Boreal" and a "Sonoran or Mexican table-land" region. On Dr. Merriam's 'Provisional Biological Map of North America showing the principal Life Areas' (Map 5), there are: (1) An Arctic division, limited at the southward by the beginning of forest vegetation. (2) A Boreal Province, extending obliquely across the continent from New England and Newfoundland to Alaska, with prolongations southward along the principal mountain ranges. This nearly coincides with what has been sometimes termed the Cold Temperate Region. (3) A Sonoran Province, occupying the region intervening between the

Boreal and the Tropical Provinces, and corresponding to the Warm Temperate Region of some authors. (4) The Tropical Province, extending into North America from the south, and embracing Central America and the Antilles, the lowlands of Mexico, and a narrow coast belt of southern Florida.

For many years that portion of North America situated mainly within the United States has been divided into a so-called Eastern Province, a Middle Province, and a Western Province. While these 'Provinces' (established by Baird in 1866) have been hitherto generally accepted, they have been unsatisfactory and troublesome, but have escaped searching analysis till taken in hand by Dr. Merriam in the present paper. Following the clue furnished by the evident fact that the life of middle North America is made up of increments from both the north and the south, and that the boreal element extends far to the southward at the higher elevations, while the life from the south occupies the intervening lowlands, resulting in the interdigitation of areas stocked respectively with northern and southern types, it became clear that these long recognized Provinces were untenable, in so far at least as any basis for the so-called 'Middle' or 'Central' Province is concerned. This Central Province was made up of the Rocky Mountain region, the Great Plains to the eastward, and the Great Basin to the westward. The Rocky Mountain region evidently derived its life from the north, and is essentially a part of the 'Boreal' or Cold Temperate life-region. The life of the Great Plains and the Great Basin is as obviously derived mainly from the south, with an intermixture of more or less modified northern elements. With this key to the problem Dr. Merriam has separated his Sonoran Province (which is made to include the whole breadth of the continent) into six 'sub-regions,' as follows: (1) an Arid or Sonoran sub-region, occupying the table-land of Mexico, western Texas, portions of New Mexico, Arizona, and southern California; (2) a Californian sub-region, occupying the greater part of California; (3) a Lower Californian sub-region; (4) a Great Basin sub-region, embracing the area between the Rocky Mountains and the Sierra Nevada, north to the Plains of the Columbia; (5) a Great Plains sub-region, extending from Northern Texas to the Plains of the Saskatchewan; (6) a Louisianian or Austroriparian sub-region, occupying the eastern United States from the southern border of the Alleghanian Fauna, as commonly recognized, southward to the Gulf coast, and thus equivalent to the Carolinian and Louisianian Faunas, as usually limited by ornithologists. These regions are all shown in colors on Map 5, but the distinguishing elements of each are not stated. They seem, however, fairly tenable, though set forth as merely provisional, and presumably open to some modification. Even the terms to designate the relative rank of the various subdivisions are used tentatively, the whole scheme of nomenclature requiring careful attention, since nearly every term employed for the designation of the different grades of life areas has been used differently by different authors. The matter

sadly needs rigorous sifting, and placing on a basis comparable with the terms used for groups in zoölogy, and in geological terminology.*

Some twenty years since North America east of the Great Plains was subdivided, on the basis of bird life, into a series of minor areas termed faunas, eight in number, including the whole Atlantic coast region, from the southern extremity of Florida to the Arctic coast. At that time our knowledge of the North America fauna at large was too imperfect to permit the extension of similar generalizations to other parts. Although our knowledge of the middle and western portions of the continent has since greatly increased, it is still insufficient for final work in respect to the minor faunal areas, coördinate in rank with the 'faunas' recognized for the Atlantic coast region. In Dr. Merriam's 'Map of Arizona showing the Life Areas of the Colorado Plateau south of the Grand Cañon' (Map 1), and in his maps 2, 3, and 4 of 'San Francisco Mountain and Vicinity,' devoted to the distribution of various species of forest trees, a model is set which may well be emulated in the prosecution of similar work. Investigation of large areas on this minute scale, however, is beyond the means of individual workers; on this account, and from its high economic importance, it is a proper undertaking for a Bureau of the Government; and it is most gratifying that the appropriations for such work—this year fortunately much increased—are sure to be so wisely and economically expended. The present report is an emphatic illustration of the practicability, the scientific interest, and the economic importance of a careful biologic survey of our vast territory.

The publication of these results will doubtless incite other investigators to activity, and it is hence important that certain questions of nomenclature should be speedily settled. At the last Congress of the A. O. U., Dr. Merriam presented in abstract an extended paper on 'The Primary Faunal Regions of North America,' illustrated by colored maps on a uniform scale, showing comparatively the results of all previous work on the subject, and presenting a bibliographical and historic *résumé* of each contribution to the general subject of North American life areas, including the work of botanists as well as zoölogists. Such a summary should present a basis for a consistent scheme of terminology and nomenclature, based as far as possible on the rule of priority. The terms 'fauna,' 'area,' 'region,' etc., are used commonly in a general or non-technical sense, but often also technically, to designate a definite grade in the scale of subdivisions. In like manner "transitional area," or "transitional region," is of necessity used in a general and non-technical sense, but is reprehensible when used in a specific sense, as has been sometimes the case, since any region lying between two others, is, in the very nature of things, more or less transitional in character; hence the term is better reserved for the designation of a condition rather than for the indication, in the sense of a nomenclatural term, of any geographic area.—J. A. A.

* Cf. Allen, Bull. Mus. Comp. Zoölogy, Vol. III, No. 2, 1871, pp. 378, 379.